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GENERAL NOTES.

Members and friends of the Society are invited to aid the Committee on Publication in carrying out the work of this department. Communications of general interest will be gladly received, and may be sent to SIDNEY D. TOWNLEY, 2023 Bancroft Way, Berkeley, California.

The appearance of the new star in the constellation *Perseus* aroused considerable interest in the astronomical world, such objects being rare in the history of astronomy. According to an article in *The Observatory* for March, there are only about a score on record, as the following list, taken from Miss CLERKE'S "System of the Stars" will show. The date of the discovery and the constellation in which they appeared are given:—

B. C. 134.	*Scorpio.*	827.	*Scorpio.*	1670.	*Vulpecula*
A. D. 123.	*Ophiuchus.*	1012.	*Aries.*	1848.	*Ophiuchus.*
173.	*Centaurus.*	1203.	*Scorpio.*	1860.	*Scorpio.*
386.	*Sagittarius.*	1230.	*Ophiuchus.*	1866.	*Corona.*
389.	*Aquila.*	1572.	*Cassiopeia.*	1876.	*Cygnus.*
393.	*Scorpio.*	1604.	*Ophiuchus.*	1885.	*Andromeda.*

To these must be added the *Novæ*, in *Auriga*, 1892, in *Norma*, 1893; in *Carina*, 1895; in *Centaurus*, 1895; in *Sagittarius*, 1898; and in *Aquila*, 1899; the four from 1893 to 1898 having been discovered photographically by the Harvard observers. The fact that the later years have witnessed the discovery of a greater number of such stars is but a natural result of the greater number of observers and the fact that in earlier times only the brighter *Novæ* were observed and recorded.

To find a parallel to the present case of *Nova Persei*, it is necessary to go back to the year 1604, when the star known as KEPLER'S, but discovered by BRUNOWSKI, appeared as bright as *Jupiter*. TYCHO'S star, in 1572, was first seen as bright as *Jupiter* and increased quickly, so that it became equal to *Venus;* the star in 1203 is said to have been equal to *Saturn*, and others in the list were equally conspicuous. The appearance of these was, in general, very sudden. It is of interest to note that all of these stars with the exception of the stars of 1012 and 1866 lay in or close to the Milky Way. The star of 1860 appeared suddenly as a 7th-magnitude star in the middle of a nebula or close cluster (Dreyer 6093), and the star in *Andromeda* was seen by Dr. HARTWIG on August 31, 1885, as a nucleus to the well-known nebula.

Sir WILLIAM HUGGINS pronounced the spectrum of *T Coronæ* to be due to glowing hydrogen, as though it were a sun like our own, with very exaggerated prominences. The star *Nova Cygni*, as seen by VOGEL, had at first a spectrum nearly continuous, crossed by bright lines due to hydrogen, and by others due to unknown substances, but finally became similar to the spectrum of a nebula.

The spectrum of the *Nova* in *Auriga* was crossed by bright lines due to hydrogen and other elements, but also by dark lines due to the same elements, the bright and dark lines being displaced relatively to each other. This was interpreted by Professor LOCKYER and others as an evidence of relative motion of two bodies; and from this it was assumed that two bodies had collided and that the outburst of heat was caused by the loss of kinetic energy. This is held by Professor LOCKYER to be true of *Nova Persei*. Another supposition of equal weight would be that the spectrum was that of a body of the solar type from which hydrogen gas was emanating with the velocity shown by the displacement of the lines, some 700 miles a second, which is not an inconceivable velocity. This latter supposition is, however, lacking in the fact that it does not assign a cause for the sudden outburst, as the collision theory does.

The article concludes with a statement of the present status of these variable stars. The star of KEPLER and the nucleus in the nebula of *Andromeda*, as well as *Nova Aurigæ*,* have disappeared, *T Coronæ* has resumed the condition it was in before 1866. *Nova Cygni* was seen as a 15th-magnitude star in 1885, and probably remains so at present. There is reason for thinking that *Nova Cygni* of 1670, which lasted as a bright star until 1672, was identical with the 11th-magnitude star found by Mr. HIND in 1852.

The variability of the light of the planet *Eros*, noted in the last issue of the *Publications*, has been investigated by M. ANDRÉ, of Lyons, who has determined its period and advanced an explanation for the variation. Combining his own results with those of Herr DEICHMUELLER at Bonn, M. ANDRÉ announced that the variation had a period of 5^h 16^m, and consisted of two waves. The second wave is shorter than the first by twenty-five minutes, although this is open to some question. Other observers

* See Professor CAMPBELL'S note in Notices from Lick Observatory.

had also noted the variation in light, but had fixed the period at $2^h\ 37^m.6$, or nearly one-half of the double period given by M. ANDRÉ.

The light curve is almost precisely similar to those of *B Lyræ* and *U Pegasi*, the variation of light being continuous without any flat portion to the curve, as in stars of the *Algol* type. The variation is at least a magnitude, some observers making it as much as 1.5 or 2 magnitudes.

M. ANDRÉ offers as an explanation of the variation the supposition that the planet is double, the two minima being caused by the occultation of one of the pair by the other. He gives the elements of the system, the semi-major axis of relative orbit being but slightly greater than the sum of radii. The dimensions of the two bodies are as 3 to 2, with a mean density of the system of 2.4.

At Toulouse, M. L. MONTANGERAUD allowed the planet to trail on the plate, and the maxima and minima could thus be located. The period obtained was $2^h\ 38^m$, which is exactly one-half of that given by M. ANDRÉ.

Mr. CROMMELIN, in commenting in *The Observatory* on the theory advanced by M. ANDRÉ, says: "It is scarcely necessary to say that this hypothesis is only given provisionally and as affording a possible explanation of the light curve. The idea of a double minor planet is an utterly unexpected one, and one that does not at first sight commend itself as at all probable. But if we once admit the initial fact that *Eros* in February was subject to variations of light considerably exceeding a magnitude,— a fact for which the evidence is certainly strong,— we seem almost driven to some such hypothesis as that of M. ANDRÉ."

A note in the *Monthly Notices* of the Royal Astronomical Society for February, 1901, summarizes the report of M. BOUQUET upon the visual observations of the ten expeditions sent out by the French Academy of Sciences to observe the transit of *Venus* in 1882. The results of M. BOUQUET appeared in *Comptes Rendus* in 1899. The ten different expeditions occupied stations in North and South America, separated by 85° of latitude, while the most eastern were distant but 3° of longitude from the most western. The best determination of the solar parallax was therefore to be determined by HALLEY'S method from observations of second and third contact. The final result, as arrived at by M. BOUQUET, was 8″.80 for the solar parallax.

In the same issue of the *Monthly Notices* a review is given of Volume VIII, Part 2, of the "Annals of the Royal Observatory Cape of Good Hope," in which Dr. DAVID GILL publishes the results of his observations of stellar parallax in the Southern Hemisphere made since 1887.

The resulting stellar parallaxes published in this volume are:—

Star.	Mag.	Parallax.	Prob. Error.
Sirius	—1. 8	0″.370	±0″.010
Canopus	—1. 0	0 .000	±0 .010
Rigel.........	0.35	0 .000	±0 .010
Achernar	0. 5	0 .043	±0 .015
β *Centauri*	0. 8	0 .046	±0 .017
α *Crucis*	1. 0	0 .050	±0 .019
Spica	1. 2	—0 .019	±0 .010
Formalhaut ...	1. 3	0 .130	±0 .014
α *Scorpii*......	1. 3	0 .021	±0 .012
β *Crucis*	1. 5	0 .000	±0 .008
α *Gruis*	1. 9	0 .015	±0 .007
β *Hydri*	2. 9	0 .134	±0 .007
τ *Ceti*	3. 6	0 .310	±0 .012
Lacaille 2957..	6. 0	0 .064	±0 .024
P XIV 212 ...	{ A 6. 3 B 7. 9	0 .167	±0 .008
Z. C. V. 243 ..	8. 5	0 .312	±0 .016

A TEXT-BOOK OF ASTRONOMY. By GEORGE C. COMSTOCK, Director of the Washburn Observatory and Professor of Astronomy in the University of Wisconsin. D. Appleton and Company, New York. 391 pages. Cloth. $1.30.

Written in simple, clear, and concise language, illustrated by appropriate and well-constructed figures, made interesting by apt and homely comparisons and useful by numerous and well-chosen exercises, this book forms a welcome addition to the list of elementary text-books of astronomy. Professor COMSTOCK has written a new book, and has not merely rearranged the material of earlier ones. His purpose is clearly outlined in the first paragraph of the preface:—

"The present work is not a compendium of astronomy or an outline of popular reading in that science. It has been prepared as a text-book, and the author has purposely omitted from it much matter interesting as well as important to a complete view of the science, and has endeavored

to concentrate attention upon those parts of the subject that possess special educational value. From this point of view matter which permits of experimental treatment with simple apparatus is of peculiar value and is given a prominence in the text beyond its just due in a well-balanced exposition of the elements of astronomy, while topics, such as the results of spectrum analysis, which depend upon elaborate apparatus, are in the experimental part of the work accorded much less space than their intrinsic importance would justify."

Inspection of the table of contents shows that the author has departed widely from the conventional methods of treating the elements of the subject, especially in the first six and the eighth chapters. The special features of the book are numerous questions scattered throughout the text, to teach the student to think and construct as well as to read and assimilate; and many exercises, in the nature of laboratory work, all to be performed with simple apparatus, easily constructed by the students themselves. In these exercises the students obtain practice in the three fundamental processes of all practical astronomy, the measurement of time, angle, and distance. Although the exercises are numerous, still the author has not exhausted the list, and might with profit have given more.

It would have been well, if possible, to so arrange the material that the exercises, which all fall in the first five chapters, would be more distributed. It is not necessary, of course, that the teacher present the material in just the order given; but the facts are that the large majority of teachers will present it in that way. The author has, apparently, purposely avoided all reference to the Nautical Almanac and American Ephemeris. The wisdom of this is open to question. While it is unnecessary and certainly unwise to introduce the Ephemeris at first, and thus make the student dependent upon it, still I think it equally unwise to totally exclude it. An explanation of the Ephemeris and a few exercises which demand its use should, I think, be included in the most elementary course in practical astronomy. Any school in which astronomy is taught can surely afford to buy one of these books each year, and any person capable of teaching the subject should be able to use the book intelligently.

Many bits of good advice are given in connection with the exercises. On page 3, for instance, in connection with a measurement to be made, we find, "but perfection can seldom be attained, and one of the first lessons to be learned in any science which deals with measurement is, that however careful we may be in

our work, some minute error will cling to it, and our results can be only approximately true. This, however, should not be taken as an excuse for careless work, but rather as a stimulus to extra effort in order that the unavoidable errors may be made as small as possible."

A point to be commended is the use of the metric system throughout the exercises. In the descriptive parts of the text, however, the author retains the English units. Perhaps it is best to break away gradually, but I believe no criticism would have been offered if the metric system had been used throughout.

The illustrations and figures of the book are well chosen, and the student should learn something from each. Very few, if any, have been inserted for pictorial effect. Among the figures which deserve special mention are numbers 16 and 17 from which the position of any of the five brighter planets may be determined for a number of years; number 23, which ingeniously illustrates the tide-raising forces; number 54, illustrating the Moon's rotation; number 121, illustrating the determination of the parallax of the fixed stars.

Of the many apt illustrations contained in the book, the following (page 121) is one of the best:—

"Every such timepiece, whether it be of the nutmeg variety which sells for a dollar, or whether it be the standard clock of a great national observatory, is made up of the same essential parts, which fall naturally into four classes, which we may compare with the departments of a well-ordered factory: I. A time-keeping department, the pendulum or balance-spring, whose oscillations must all be of equal duration. II. A power department, the weights or mainspring, which, when wound, store up the power applied from outside and give it out piecemeal as required to keep the first department running. III. A publication department, the dial and hands, which give out the time furnished by department I. IV. A transportation department, the wheels which connect the other three and serve as a means of transmitting power and time from one to the other. The case of either clock or watch is merely the roof which shelters it and forms no department of its industry. Of these departments the first is by far the most important, and its good or bad performance makes or mars the credit of the clock."

On page 209, in speaking of the law of the Sun's rotation as "very peculiar and extraordinary," the author gives a new lease of life to a long-standing misconception. Is there anything peculiar or extraordinary in the fact that the particles of a gaseous body move differently under the forces of rotation than do the particles of a solid body? Would it not rather be peculiar and

extraordinary if a gaseous body did rotate in the same way as a solid one? A few years ago Dr. WILCZYNSKI, in "Hydrodynamische Untersuchungen mit Anwendungen auf die Theorie der Sonnenrotation," showed that the law of the Sun's rotation was only one of an infinite number of ways in which a gaseous body might rotate.

The last chapter, "Growth and Decay," deserves special mention. It is a conservative philosophic exposition of the best theories of solar and sidereal evolution, and although not out of place in a high-school text, it might well form a part of a larger treatise.

The work of the publishers has been most excellently done, and the book, as a whole is, I think, the best elementary astronomy yet published. S. D. T.

The Directors of the Benjamin Apthorp Gould Fund announce that the following grants have been made: To Mr. JOHN A. PARKHURST, $30; to Dr. HERMAN S. DAVIS, $500; to Mr. PAUL S. YENDELL, $225; to Professor SIMON NEWCOMB, $25. A considerable additional amount of income has accrued, for the distribution of which applications are awaited. In addition to the above call for applications the Directors, desiring to stimulate the participation of American astronomers in the attempt to bring up the arrears of cometary research, offer to them the sum of $500 for computation of the definitive orbits of comets (see list in *A. J.*, 493, p. 104); this sum to be distributed at the average rate of $100 for each computation,— the amount to vary according to the relative difficulty of the computation, and to be determined by the Directors of the Gould Fund. Computers should promptly notify the Directors (Professors LEWIS BOSS and ASAPH HALL and Dr. S. C. CHANDLER) of their participation or desire to participate, and manuscripts should be submitted not much later than July 1, 1902.

The degree of Doctor of Philosophy was recently conferred by the University of California upon two students of astronomy. Mr. R. T. CRAWFORD, for three years Fellow at the Lick Observatory, presented Astronomy as his major subject, and Mathematics and Physics as his minors. His thesis was entitled, "Determination of the Constant of Refraction from Observations made with the Repsold Meridian-Circle of the Lick Observa-

tory." Mr. F. E. Ross, Fellow at the Lick Observatory in 1898–'99, presented Mathematics as his major, and Astronomy and Physics as his minors. His thesis was "On Differential Equations belonging to a Ternary Linearoid Group."

The meeting of the Board of Directors of the Astronomical Society of the Pacific, and the meeting of the Society itself, which were to be held at the Lick Observatory on June 8th, were adjourned, without transacting business, for lack of a quorum.